Introduction to Programming with Python

Course: CSE 1100 – Introduction to Computing

Lecturer: Lenandlar Singh

Date: November 27, 2025

Objectives

- At the end of this lecture, students should be able to:
  - Create and use lists
  - Create and use loops
  - Use loops to process lists

Python list

A List is a kind of Collection

- A collection allows us to put many values in a single "variable"
- A collection is nice because we can carry all many values around in one convenient package.

```
friends = [ 'Joseph', 'Glenn', 'Sally' ]

carryon = [ 'socks', 'shirt', 'perfume' ]
```

Python list

Python Lists

The list is a most versatile datatype available in Python which can be written as a list of comma-separated values *items* between square brackets. Important thing about a list is that items in a list need not be of the same type.

Creating a list is as simple as putting different comma-separated values between square brackets. For example –

```
list1 = ['physics', 'chemistry', 1997, 2000];
list2 = [1, 2, 3, 4, 5 ];
list3 = ["a", "b", "c", "d"];
```

Python list functions

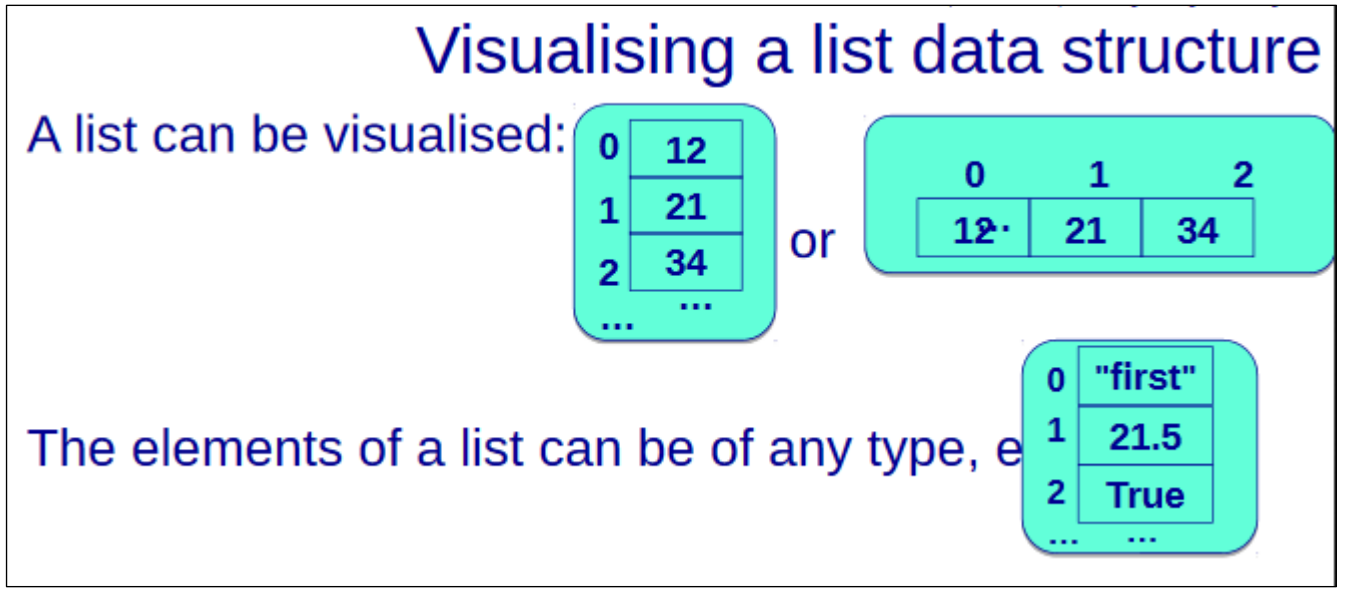
Built in Functions and Lists

- There are a number of functions built into Python that take lists as parameters
- Remember the loops we built? These are much simpler

```
>>> nums = [3, 41, 12, 9, 74, 15]
>>> print len(nums)
6
>>> print max(nums)
74
>>> print min(nums)
3
>>> print sum(nums)
154
>>> print sum(nums)/len(nums)
25
```

http://docs.python.org/lib/built-in-funcs.html

Python list

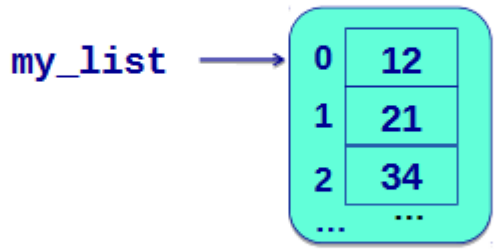

Visualising a list data structure
A list can be visualised:
0
1
2
...
12
21
34
...
or
0
1
2
12
21
34
The elements of a list can be of any type, e
0
1
2
...
"first"
21.5
True
...

Python list

List - Square brackets

Square brackets are used with lists.

For example, for the following list (named `my_list`),



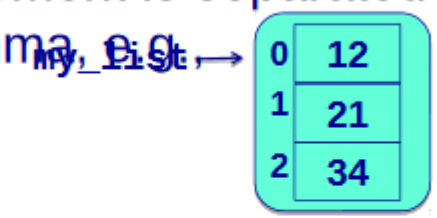
the element at position 1 in the list can be referred to as `my_list[1]`, the first element (at position 0 in the list) can be referred to as `my_list[0]`, and so on.

Python list

Creating a list in Python

Square brackets are used to **create a list** which contains some elements. Each element is separated from the next element using a comma, e.g.

```
my_list = [12, 21, 34]
```



An **empty list** (contains no elements) can be created:

```
my_list = []
```

Another way to create an empty list is:

```
my_list = list()
```

Python list

Printing a list, the length of a list

Lists can be printed using the print() function:

```
my_list = [5, 2, 7, 4, 3, 8, 0, 1, 9, 6, -3]
list1 = []
list2 = ['Try', 'something', 'new']
print(my_list)
print(list1)
print(list2)
```

```
[5, 2, 7, 4, 3, 8, 0, 1, 9, 6, -3]
[]
['Try', 'something', 'new']
```

The **length of a list** is the number of elements currently in the list. The function len() can be used to obtain the current length of a list, e.g.,

```
#Continuing from the code above
number_of_elements = len(my_list)
print(number_of_elements)
print(len(list1))
print(len(list2))
```

```
11
0
3
```

Visiting each element in a list

```
my_list =  ['No', 'keyboard', 'detected.', 'Press', 'F1',
                                           'to', 'continue']
```

```
for element in my_list:
    print(element)
```

```
No
keyboard
detected.
Press
F1
to
continue
```

Processing a list

```
num = [1,2,3,5,3,6,7,8,4,8]
count = 0

for items in num:
    if items > 5:
        count = count + 1

print(count, "items greater than 5")
```

Adding/Appending to a list

```
numbers =[22,300,400, 440, 650]

for i in range(0,5):
    print(numbers[i])

for i in range(0,5):
    numbers.append(i)

for i in range(0,len(numbers)):
    print(numbers[i])
```

Basic Search on a list

```
numbers =[22,300,400,440,650]

for i in range(0,5):
    print(numbers[i])

searchTerm = int(input('enter search value '))

if searchTerm in numbers:
        print('search term found ')
```

Loops/Iteration in Python

- Iteration /Loop means same code is executed repeatedly until some condition / exit point
- Different kinds of loops
  - **for** loop - A for loop is used for iterating over a sequence (that is either a list, a tuple, a dictionary, a set, or a string).
  - While loop

for loop

```
person = input('Enter your name: ')

for i in range(0,5):
    print('Hello', person)
```

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
  print(x)
```

```
for i in range(0,5):
    print('i is ', i)
```

The range() function

The range() Function
To loop through a set of code a specified number of times, we can use the range() function,

The range() function returns a sequence of numbers, starting from 0 by default, and increments by 1 (by default), and ends at a specified number.

Note that range(6) is not the values of 0 to 6, but the values 0 to 5.

The range() function defaults to 0 as a starting value, however it is possible to specify the starting value by adding a parameter: range(2, 6), which means values from 2 to 6 (but not including 6):

Generating Random numbers

```
import random

num = [0,0,0,0,0]
count = 0

for i in range(0,5):
    num[i] = random.randrange(1,10)

print(num)
```

Program generates a list of 5 random numbers from 1 to 9. These numbers replaces the old values[0,0,0,0,0] in the list

Generating Random numbers

```
import random

num = []
count = 0

for i in range(0,100):
    num.append(random.randrange(1,10))

print(num)
```

Program generates a list of 100 random numbers from 1 to 9. These numbers are append to the blank list[ ]

Homework

- Write a program in python that collects a list of n numbers from the user via the keyboard and calculates how many numbers are greater than the average of all the numbers

End of Lecture!!!